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U.S. Navy/U.S. Marine Corps Command and Control in the 21st Century

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ABSTRACT

This paper simply seeks to outline a clear path for U.S. Marine Corps policy makers to follow as they attempt to use C2 as a force multiplier in future conflicts. This is of paramount importance because in this Post Cold-War era, our forces will shrink and we shall fight with the Reagan-era weapons we have in 1993 for somewhere between 10 and 30 years into the future. We cannot afford to squander anything. And, we cannot afford to spend our way out of any future acquisition crisis either. So, joint, interoperable, cost-effective C2 systems seem to be essential to smart, joint warfighting into the 21st century.

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DISCLAIMER

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INTRODUCTION

The hallmark of the new world order is disorder. The reality of the enlightened world after the collapse of Communism is too many people and not enough world. The millions of have-nots who looked to the Communist ideal of equality as a ray of hope and as a counter to perceived Western imperialism and exploitation are disillusioned and madder than ever. Compounding the hot wind of discontent and disorder around the globe is the re-emergence of age old rivalries among groups/tribes/nations who see themselves artificially locked out of, or into, nation states that do not match their traditional homelands. Economic gloom hangs over the world like a pale. Political disenchantment is rampant in the old Soviet block and throughout the Third world. As the gulf between the haves and have-nots widens, all of the propaganda of the East and the West is now very suspect. World wide instantaneous mass media makes the "mushroom syndrome" (keep them in the dark and feed them dung) much harder to enforce.

So, where are we? It seems to me that there are two universal truths stalking the earth as we rocket toward the third millennium. To paraphrase Lenin and Mao, Power is laying around in the street waiting for someone to pick it up and power emanates

from the barrel of a gun. The "New World Order" is a simplistic euphemism for a desperate humanity steadily grinding up its limited resources in a quest to go to an ill defined "somewhere", while trying not to step into nuclear or environmental oblivion. The bottom line is that the world is not a safer place.

Thrust upon this strategic landscape is the U.S. Marine Corps/ U.S. Navy team as part of the armed forces of the only remaining superpower standing after the forty-year Cold War. And, in this new era, the Navy/Marine team is taking on new significance. It is clearly outlined in the September 1992 Secretary of the Navy White Letter "From the Sea":

NAVAL EXPEDITIONARY FORCES

SHAPED FOR JOINT OPERATIONS

OPERATING FORWARD FROM THE SEA

TAILORED FOR NATIONAL NEEDS

What this means to me is that the Navy/Marine team will carry a large share of the U.S. National Security Strategy into the next century, both in combat and in non-traditional roles and missions. One of the major factors causing this is the loss of U.S. bases overseas (forward based) at the exact same time that our allies and friends need us to be able to respond across the spectrum of conflict almost instantly (forward deployed). The purpose of this paper is to examine in some detail the glue that holds the Navy/ Marine team together in peace and war, the central nervous system of this and every effective combat force, namely the command and control system. I will examine where we are and where we are going.

I will look for major disconnects, interoperability failures, jointness or lack thereof, training efficiencies, cost savings, and finally a "sanity check" in light of the evolving mission of the Navy/ M arine team as we press into the 21st century.

CHAPTER 2

Joint Command and Control

In this era of diminishing budgets, our USMC/ USN command and control (C2) system must be as cost effective as possible. In this time of joint operations, it must be totally interoperable in order to be a force multiplier. On this multipolar, highly volatile world political scene, it must be flexible and responsive in order to work across the spectrum from Humanitarian operations such as Sea Angel in Bangladesh, to Peace-making operations like the current Somalia effort, to general war with weapons of mass destruction. And while the current C2 system does work well, it was largely designed on the Navy side to fight the Blue water, open ocean, War at Sea battle. The focus of "From the Sea" is power projection ashore by the USN/USMC team and LITTORAL warfare. The loss of our overseas bases clearly shows the need for this revised focus by the Navy. Therefore, I think that we need to examine our C2 system in light of these changes to ensure that we are procuring systems, training personnel, and employing forces to meet the challenges of the 21st century in support of the national strategy. So, lets start with a definition.

What is Command and Control?

C2 is most easily described by example. When the football quarterback calls the next play in the huddle, he is giving a command, telling his team what to do. After the ball is snapped,

the quarterback, by means of voice and hand signals, controls the action of his team during the execution of the planned (commanded) play. Similarly, at the simplest military level, lets picture the second lieutenant platoon commander whose mission is to destroy an enemy machine gun position. The lieutenant gives his troops a verbal command/order "destroy that machine gun position". He then controls the execution of his command by verbal instructions, hand and arm signals, or radio communications. So, at its most basic level, C2 is the ability to issue instructions and to direct the execution of those instructions. The Department of Defense defines C2 this way:

> The exercise of authority and direction by a purposely designated commander over assigned forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.[1]

Command and control, in other words, are both verbs and nouns. As verbs, they are what a commander does, a process. As nouns, they are the arrangement of people, equipment, and procedures that help commanders do what they do, they name a system.[2]

Why examine command and control?

Well, lets restate the qualities that we seek:

Cost effective.- Are we getting the most bang for the taxpayers buck? Are we using and planning to procure the C2 systems that are strategically, operationally, and tactically required? We should buy no more, and no less, than required.

Interoperable.- The heart of C2 is the free flow of information from commanders to warriors. And, in joint/combined operations , this information must flow across and between many types of military and government agencies. If the wide receiver doesn't get the quarterback's signal to turn left instead of going deep, the C2 process has failed, despite the great throwing arm and catching ability of the two players. The force multiplier effect is their ability to communicate.

Flexible.- The essence of successful military leadership, and maneuver warfare, is the ability of the commander to adjust to the current situation, to observe, orient, decide and act faster than the enemy in order to destroy his cohesion with a minimum of actual combat. On the modern battlefield, forces can be dispersed over vast theaters for long periods with many missions, or narrowly focused on one room of one building for thirty seconds in order to accomplish one mission (like a hostage rescue). The USN/USMC C2 system must be flexible enough to handle both ends of this scale and everything in between.

Responsive.- The USN/USMC C2 system (process and arrangement) must be responsive to the commander's directions and to the warrior's requirements for intelligence, orders/directions, and target

information. As in the previous example, the C2 system must be able to give the warrior the room in the building, the specific orders (kill the guards/save the hostages), and the target data (number of guards and how armed).

Where do we start?

Lets start with the Objective Concept of the Chairman of the Joint Chiefs of Staff called "C4I for Warrior" dated 4 September 1992. C4I stands for command, control, communications, computers, and intelligence. The essence of the C4I for the Warrior concept is described as follows: " It provides a beacon that will guide the Defense Department to a global C4I system that satisfies the total information requirements of the warriors when they fight as a team with a common mission. The common vision of C4I for the Warrior is to create for these joint war fighters a single view of military C4I. This view is a widely distributed, user-driven information infrastructure to which warriors will "plug in". This information infrastructure:

- provides seamless, secure connectivity;
- through multiple, highly flexible nodes;
- to all other operational elements and data bases (which are automatically updated and from which desired information can be pulled);
- for any assigned mission.

The infrastructure will bring to the warriors:

- accurate and complete pictures of their battle space,
- timely and detailed mission objectives,

- the clearest view of their targets.

Actions to implement the C4I for the Warrior vision are now being undertaken. The road map to completion includes: (1) a Quick fix phase that will achieve interoperability between existing C4I systems: (2) a Mid-term phase that achieves total interoperability for new C4I systems during development, testing, acquisition, and implementation and establishes a joint wide-area network based on digital commonality; and (3) an enduring Objective phase during which technologies and techniques are continuously identified and assimilated and a fully integrated information infrastructure is developed." [3]

Clearly, C4I for the Warrior lays out a national military road map for the warrior (sailor/ Marine in our case), the Joint Task Force/Combined Task Force, and a global C2 infrastructure. The USN/USMC team should embrace this concept whole-heartedly right now so that not a single tax payer dollar is wasted on any current or future C2 process or system that is out of sync with JCS direction (not totally interoperable, flexible, and responsive).

<u>What does C4I for the Warrior do for USN/USMC C2?</u>

In short, it examines the warrior environment from hostage rescue to nuclear war, establishes C4I goals, lays out the building blocks to reach those goals and ultimately demands C2 integration wherein a lone warrior (Navy SEAL/Recon Marine)or a JTF commander can plug into a global C4I network and get the information he needs.

The warrior environment simply means where, when and how we

fight. The C4I goals are for seamless (transparent equipment, people, and processes) which provide the requesting warrior with the following:

- 100% interoperability
- common operating equipment
- over-the-air updating
- real-time decision aiding
- flexible and modular C4I packages
- horizontal and vertical C2
- information pull on demand
- global resource management and control
- adaptive safeguards

Ideally these services should be available to a small back pack or belt carried device fed to a helmet mounted display, or to a pilot in his cockpit, or to any large battle management array like AWACS or the Combat Information Center on a warship.

The C4I building blocks on the way to the desired end state (global infrastructure) are:

1. Information collection
   - -- All digital sensor data
   - -- Robotics
   - -- Unmanned air vehicles
   - -- High capacity sensor downlinks
- C4I platforms
   - -- C2 terminal family (large to small)
   - -- Universal workstations (any warrior in any Service should

be able to use these)

-- standard configurations

-- multi level security

2. Information transport (seamless)

-- personal communications systems

-- surge capacity

-- high speed networks

-- global integrated directory

3. Information processing

-- smart databases

-- language translation (for combined operations)

-- artificial intelligence

-- information processing

-- visualization

Finally, C4I for the warrior uses the building blocks to reach the goals: " Each C4I building block encompasses capabilities that are at all levels of warrior operations. The distinctions among building block capabilities are important to the planner because they are building blocks - that is they are the modules that the planner selects to assemble the C4I that will be used for each mission. The assembly of C4I capabilities occurs at three levels in the force: the warrior level, the JTF level, and the global infrastructure level. These three levels differ dramatically in virtually all technical characteristics, yet, when they are assembled, they form a seamless whole that provides ubiquitous, robust, and responsive C4I to all the warriors within the battle

space."[4]

How is the USN proceeding toward C4I for the Warrior?

The simple answer is Copernicus. Nicholas Copernicus was a famous Polish intellectual who, in 1543, published The Revolution of Heavenly Orbis at the age of 70, after a lifetime devoted to the proposition that nature must be simple. His famous thesis was that the sun, not the earth, was the center of the solar system. Pre-Copernican astronomy could not figure the paths of the planets because they thought the Earth was the center of the solar system. Copernicus' brilliant conclusion was to look for a simple answer, a different perspective.

Today the Navy is building a new C2 system which unites form with function. But, the Navy's new C2 system is built on a shift in perspective. The Navy calls this shift, which will take a decade to complete, the Copernicus effect, and the resulting new system the Copernicus architecture.[5]

The shift is simply from communicator to operator (warrior). For decades communicators have driven the USN C2 train to the point where it is not responsive to the operators. For example, there are at least 148 named C2 systems (really circuits) that the USN tries to pipe over a very limited number of static satellite channels. The Navy is mesmerized by capacity. Of course, capacity is a problem and will remain so as long as the ultra high and extremely high frequency constellations are viewed as merely alternate, redundant paths and if the Navy continues to ignore super high frequency [satellites]. Capacity will remain a problem if all that

is done is to transfer existing data streams up to extremely high frequency one for one or down to the lower baud rates of high frequency. Data streams must be changed, and constellations and the lower frequency media must be viewed as a whole system, a switchable rail system over which compatible trains can operate.[6]

The Navy has learned a great deal about C2 requirements for contingency operations in the last decade. These are quite different from those required for blue water operations and as a result most of the contingency operations have had ad hoc connectivity, resulting in poor command and control (like Grenada). The central C2 hurtle in these contingency operations is focusing a large number of sensors on a specific area.

In marked contrast, the central C2 problem for USN blue water operations is buying battle space, which is time, through early and certain indications and warning obtained during emissions control and other minimal communications scenarios. Over the horizon targeting assumes a major role in blue water operations. The task then becomes how to pipe the right amount of intelligence seaward, using limited and vulnerable satellite capacity. Satellite capacity is limited because it is shared rather than dedicated, as in the contingency scenario. [7]

Several technical problems also exist for the USN. Of most concern is that the Navy does not have a true multi-frequency capability; it cannot use high frequency, ultra high frequency, super high frequency, and extremely high frequency interchangeably. A critical need exists for expanding the capacity of individual

channels through multiplexers that allow true dynamic bandwidth management, that is the ability to load the channel tactically. And media that can be useful are to an extent being ignored, such as sophisticated graphics displays, video and facsimile, while people are clinging to record traffic to the extent that a culture has been built around the morning message meeting. [8]

The Navy still lacks sufficient and properly equipped command centers, especially for contingency operations. While progress is being made in this area, within the intelligence community hard decisions about the amount and types of data passed to the fleet finally are being made. The Navy is working to place upper limits on communications capacity for intelligence and on establishing realistic requirements. However, a true handshake is still lacking between the intelligence fusion centers and flag plot (the tactical flag command centers) mainly because connectivity from sensor to shooter looks like steel wool. [9]

The USN solution.

To solve these problems, and directly in line with JCS's C4I for the Warrior, the USN intends to shift the heart of its system down to the warrior and across echelons to construct parallel and warfare specialized C2 networks. These networks will operate globally within warfare communities and across warfare communities by way of theater fusion centers where vital C2 data will be consolidated, sized, and tailored. The tailored data will then be sent cross community and seaward. The vertical data streams, built into the theater fusion centers in compatible formats, will be

piped over the various satellite constellations, shunted by communications stations onto dynamically multiplexed channels.

Instead of attempting to load more and more rigid data on an inflexible constellation channel, the plan is to organize a C2 system with structured, flexible input onto dynamic channels. The idea again, is to put the operator, not the communicator in the center of the system, which will operate conceptually much like air traffic in stacked patterns sharing common runways cued by controllers. An analogy can be found in the concept of limited access highways.[10]

GLOBIXS / TACTIXS

The parallel warfare networks are called global information networks (GLOBIXS). These are like the aircraft race tracks just mentioned. The term reflects the Navy C2 requirement for wide-area, theater, and global indications and warnings. The construction of these GLOBIXS networks will improve the Navy's indications and warnings systems within specific warfare communities (ASW, ASUW, AAW, STRIKE, AMPHIBIOUS, COUNTER-MINE) horizontally and through vertical streams seaward called Tactical Information Exchanges (TACTIXS) to intensify and consolidate tactical products. TACTIXS are tailored streams and battle management links used by the task force at sea. TACTIXS' precursors already exist in the tactical intelligence network (TACINTEL) ; the tactical data information exchange system (TACIXS) ; the officer in tactical command infomation exchange system (OTCIXS) ; and the joint tactical information distribution system. TACTIXS share a common function,

they are the tactical link of task force commanders and their warfare commanders. In the future, TACTIXS formats will be refined and standardized, and two basic types will emerge, targeting and battle management. Targeting mainly will be a product of the shore based fleet command, with its GLOBIXS gateways. Battle management will have shared networks among forces at sea moving intra-battle force data. [11]

Why the change?

The GLOBIXS/TACTIXS architecture, the Copernicus architecture, properly realigns the focus of Navy C2 on warfighting functions: consolidating sensor, battle management, and shooter linkages into a single, flexible system.[12] The best example of why Copernicus is needed is the infamous air tasking order (ATO) hassle during Operation Desert Storm. It took as much as eight hours for the Navy to receive the massive daily ATOs from the U.S. Air Force because of unique USN stovepipe type communications systems that were incompatible with each other and with other services. Given the volume of the ATOs, only dedicated SHF satellite communications would have handled the job. But, the carriers were not equipped with SHF terminals. So, in many cases the ATOs were ferried to the carriers by S-3 Viking aircraft. Two ways that the Copernicus program intends to prevent such debacles in the future are to place high-speed SHF satellite terminals on all ships and to upgrade to new Navy standard work stations (Desk top II computers from Sun Microsystems). These upgrades allow Air Force software to run on Navy computers which will allow a 3,000 sortie ATO to be received

in less than one hour, as opposed to eight hours. [13]

U.S. Navy Data Links

For over 30 years the Navy has depended on Link 11 (a non-jam resistant, digital link used for AAW) as its primary tactical digital information link (TADIL). Link 11 is clearly not tactically viable for the 1990s and beyond. Under the Copernicus umbrella, the Navy is upgrading to Link 16, the joint tactical information distribution system (JTIDS) already mentioned. JTIDS is a joint program which the Air Force already has fielded on AWACS. JTIDS is a much higher speed, jam-resistant data link than Link 11 and the Navy is fully participating in the program, again on Sun workstations aboard ship.

What is the Navy's bottom line?

The Navy, with Copernicus, is trying to make communications revolve around C2, not bend and twist C2 to fit limited, awkward, or inflexible communications. The push, just as in C4I for the Warrior, is to make the C2 system (the arrangement side, not the process) transparent to the warrior. This will largely be done by using technology to turn future and existing satellites into true data busses and by building dynamic Navy theater fusion centers which will gather, collate, and automatically send required tactical data seaward to USN warriors.

It must be mentioned at this point that a proposed new Navy communications system is required for the Copernicus architecture, called Communications support system (CSS). It is based on the civilian telephone/communications companies experience which

provide low cost service to distant,harsh unpredictable and stressed environments. The heart of CSS will be its ability to enable the space and electronic warfare commander to ensure that the right information can be exchanged via whatever communications media are available so that the appropriate interactions take place. [14]

CHAPTER 3

USMC FUTURE C2 ARCHITECTURE

Since the 1960s, the Marine Corps has been at the fore-front of aviation C2 in joint operations. With the fielding of an automated Tactical Air Operations Center (TAOC) in the Vietnam war that could link the USN to the U.S. Air Force, the Corps began an era of cooperation with the other services on joint air command and control. Unfortunately, the Marine Corps has struggled during this whole 30 years to extend meaningful automated C2 systems to the whole Marine Air Ground Task Force (MAGTF). Some very expensive trail-and-error programs have gone the way of the carrier pigeon with little to show for the effort:

-- AN/UYQ-4 Automated Direct Air Support Center

-- Marine Integrated Fire and Air Support System (MIFASS)

-- many iterations of the Tactical Combat Operations (TCO) system

The current Marine umbrella C2 system/program which is roughly analogous to Copernicus is the Marine Tactical Command and Control System (MTACCS). The MTACCS concept started with C2 studies conducted during 1965 and 1966, which resulted in a USMC General Operational Requirement (GOR) for MTACCS dated 1967. The Corps issued the first MTACCS Master Plan in 1976, which provided policy guidance and management efforts to improve tactical C2. The last update of that plan was in 1981. In 1983 the Corps incorporated the MTACCS Master Plan into the Marine Corps Command

and Control Master Plan (C2MP), which was last revised in August, 1987. Termination of MIFASS in 1988 put the MTACCS concept on hold for two years because MIFASS was a cornerstone of the original MTACCS concept which was a miserable failure after millions of dollars and many years of effort. Only nominal integration of tactical C2 systems has occurred since, except for the robust Marine Air Command and Control System (MACCS) and various local MAGTF and Division efforts to automate some C2 functions. [15]

MTACCS assumptions.

MTACCS development assumptions are :

-- The USMC roles and missions remain as stated in the law and the Marine Corps Master Plan

-- The USMC remains an expeditionary force in readiness, prepared to fight across the spectrum of conflict.

-- MTACCS will be fully interoperable (a difficult assumption)

-- MTACCS will be developed during a period of scarce funding. [16]

MTACCS Operational concept.

The MTACCS operational concept is basically that of C4I for the Warrior and Copernicus. Specifically, the MTACCS is to be:

-- Inter and intra operable.

-- Transparent to the warrior (Marine).

-- Able to provide needed intelligence and targeting information.

-- Able to assist preparation and dissemination of orders.

-- Able to allow the commander to direct and coordinate simultaneous employment of ground and aviation combat elements in maneuver warfare.

-- Able to employ and integrate fire support.

These attributes are so easy to say and so hard to realize. They should be examined in detail.

Interoperable - Again, this means that the USMC C2 systems must be able to exchange any and all information (voice, tactical picture, hard copy message, facsimile, and target data) with all other Services to be really effective. For example, the USMC also must be able to receive the joint force ATO in a timely manner. It must be able to integrate fire support jointly with the U.S.Army and U.S.Navy C2 systems. It has to be able to see, share, and act on air defense data in a matter of seconds to defend the MAGTF against air threats and tactical ballistic missiles (TBM) threats. Interoperability is a tall order. It means the ability to communicate. But, the myriad of U.S. military systems already fielded and in development which must be bent into interoperability compliance is close to overwhelming.

Intraoperability - This means the ability for USMC C2 systems to talk among themselves. This has and does work well today on the MACCS data link side and on the record traffic (hard copy message) side. However, multiple attempts to automate ground combat C2 systems (TCO) and fire support systems (MIFASS) have met with practically no success.

Transparent to the warrior - The ideal here is for the Marine commander to have a ready means to get needed information, mission direction, and controlling ability without having to get bogged down in the complexities of the "transparent" communications and

data systems which move and sort the needed information.

Provide intelligence and targeting data - There are many,many intelligence sources available to the commander. There is so much potentially available that the sheer volume can be overwhelming and the "right stuff" can be very hard to find. The Navy is on the right track with theater fusion centers which gather, sort, and disseminate the needed intelligence to the warriors at the point of the spear.

Preparation and dissemination of orders - This also seems so simple. But, the aforementioned ATO flap during Desert Storm proves it is not. Just within the aviation combat element (ACE) of the MAGTF, the Marine ATO is more often than not received by aircraft squadrons long after the first sorties of the day are on their missions. There are successes in this area like the Digital Control Terminal (DCT) which is widely fielded in the Corps now and has proven very useful for tactical C2. However, the DCT is useful for very short messages only.

Direct and control employment of maneuver elements - This is easy to do from air C2 nodes to aircraft cockpits. But it is extremely cumbersome to try to automatically control large ground maneuver elements in combat. Voice and hard copy message still work well.

Employ and integrate fire support - Despite the MIFASS debacle, this area does lend itself to automation of C2 in that fire solutions and target data tend to benefit from computer solutions very well.

Is MTACCS viable?

The short answer is maybe, with enough money and time. The hurtles are very tall. For example, several different message standards are currently in use by the USMC and another one is coming soon. Message standards are basically the machine languages set up so that computer systems can talk to each other. Today, the MACCS uses M series messages to exchange tactical data, like the USN Link 11 already mentioned, over what are commonly referred to as TADILs A, B, C, and NATO Link 1. All four of these have been in use for over twenty years. Another fielded, but totally different, message standard is the Position Location Information (PLI) structure used by the Position Location Reporting System (PLRS). Another fielded, but non-interoperable system is the Electronic Warfare (EW) downlink from the Marine EA-6B aircraft to Corps EW ground station called TERPES. And finally, of course, a completely different message standard is used for record traffic over the Defense Communications System (DCS). Add to this maze the introduction of the TADIL J or J series message standard that will be required with the fielding of JTIDS in the Corps as was previously discussed with the Navy. Now place MTACCS on this scene with yet another unique message standard called MTS messages (Marine Tactical System) which will supposedly support MTACCS itself and hopefully be inter and intra operable.

There are still other message standards in use right now (MTS, VMF { which is the joint standard for fire support }, Tactical Receive Equipment (TRE), ect.) but the point is made. Marine C2 is not really intraoperable or transparent. Huge amounts of Marine

effort are required to set up and operate these various, complex systems that do not always even talk among themselves. It is hardly transparent to the warrior. Quite the reverse is true, as was seen in Desert Storm. Massive effort was needed to get Marine C2, especially air C2 up and working in Saudi Arabia.

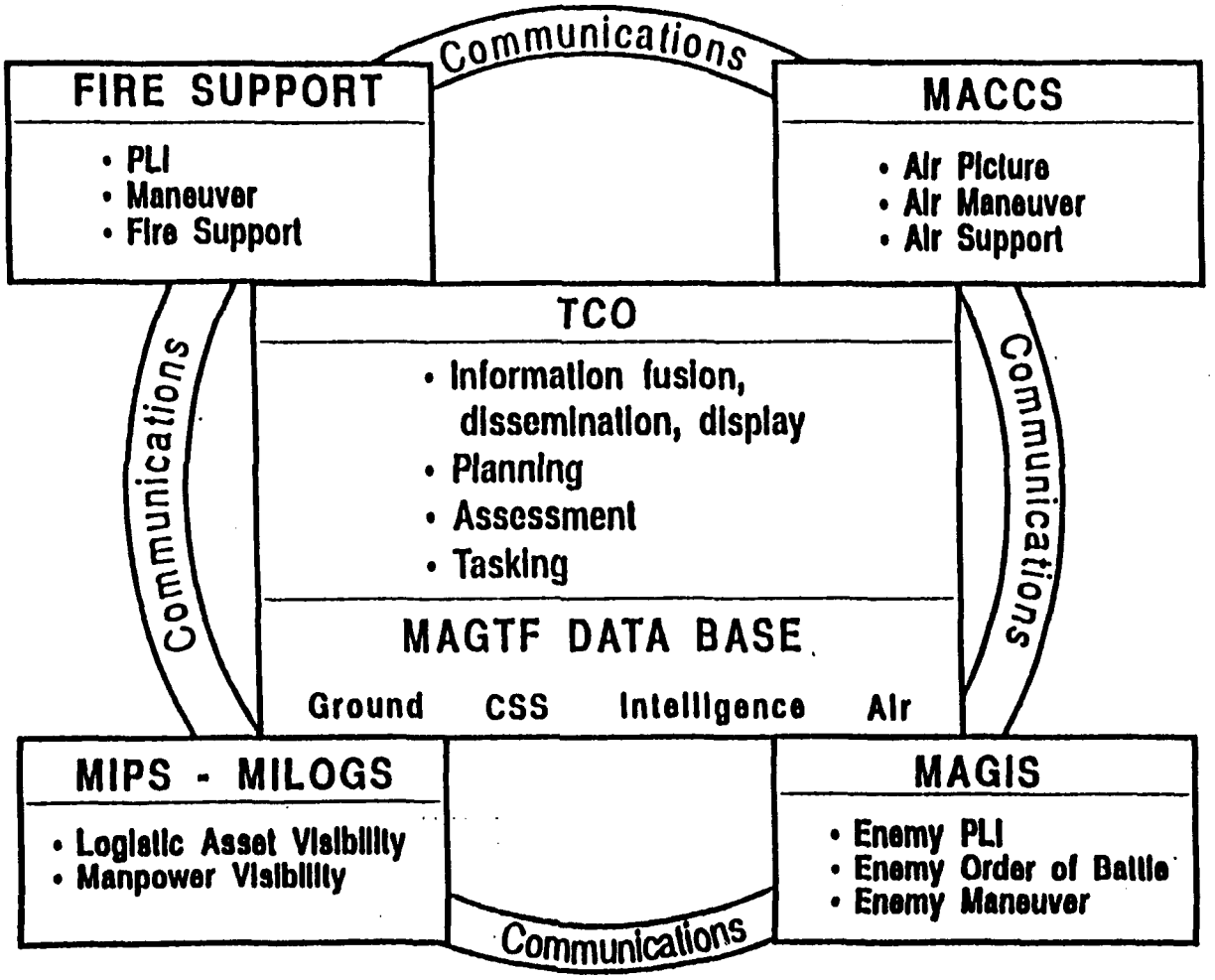
Where are we with MTACCS?

I do not intend to paint a hopeless picture. We must use the existing Marine C2 systems for years to come. For purposes of clarity, figure 1 shows the MTACCS overall architecture, figure 2 shows the ground C2 system, figure 3 provides the logistics (Consolidated Service Support (CSS)) C2 system, figure 4 shows the air C2 system and 5 shows the intelligence C2 system of the Corps and of MTACCS as it currently exists.

Clearly, MTACCS must evolve in an orchestrated manner over the coming months and years in lock step with C4I for the Warrior and Copernicus. Again, this is easy to demand and very hard to do. Only some type of joint enforcement hammer, like a strangle hold on the services C2 budgets, will force this to happen. The Joint Tactical C3 Agency (JTC3A) is established for this purpose. They should just enforce the rules.

On the communications side of MTACCS, the tactical communications architecture of the USMC must evolve from a network of functionally dedicated voice channels into a system of information pipelines connecting various elements of the MAGTF. Instead of passing function specific (administrative, tactical, logistic, intelligence) type messages on dedicated nets,

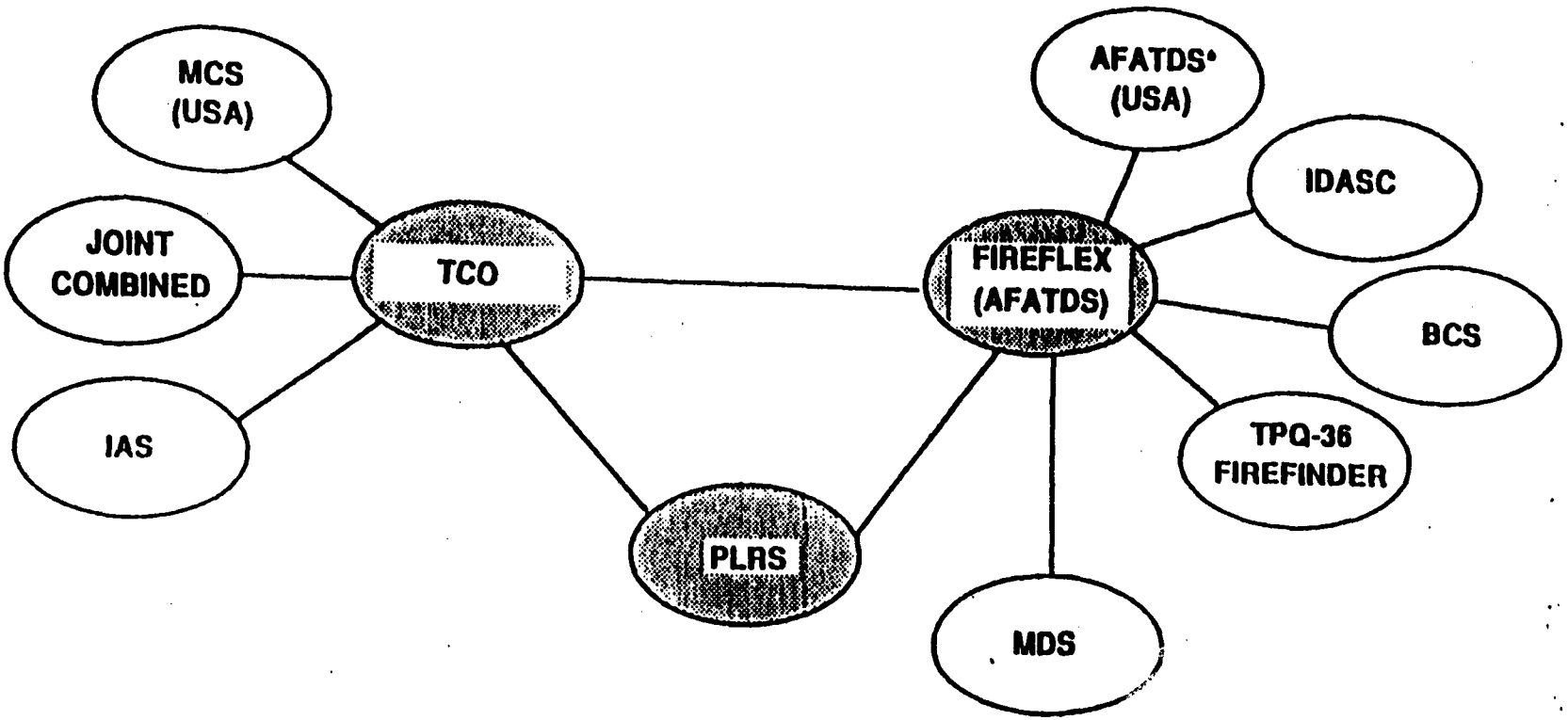
MARINE TACTICAL COMMAND AND CONTROL SYSTEM (MTACCS)



SOURCE: MTACCS Description Document, Dec 90
Updated by L.E. Smith
April 1991

Figure - 1

GROUND C2 SUBSYSTEMS AND INTERFACES



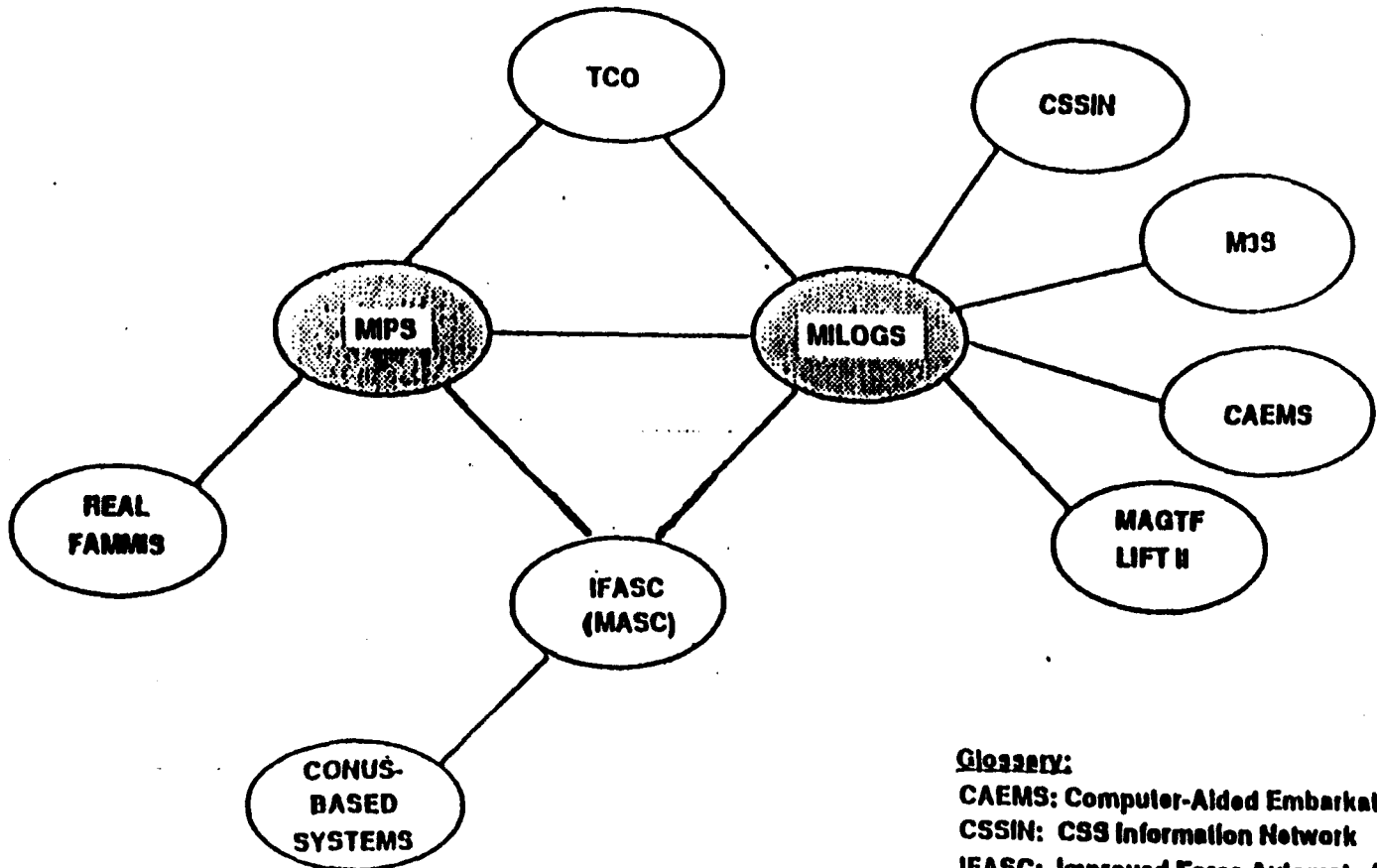
Key: MTACCS Ground C2 Subsystem

*Note: USMC and USA have an MOU and are actively working together on a multi-Service version of AFATDS to meet both Services' ADP support requirements for Fire Support C2.

SOURCE: IDA Assessment ADP Commonality, 1989

Figure - 2

MTACCS CSS C2 SUBSYSTEMS AND INTERFACES



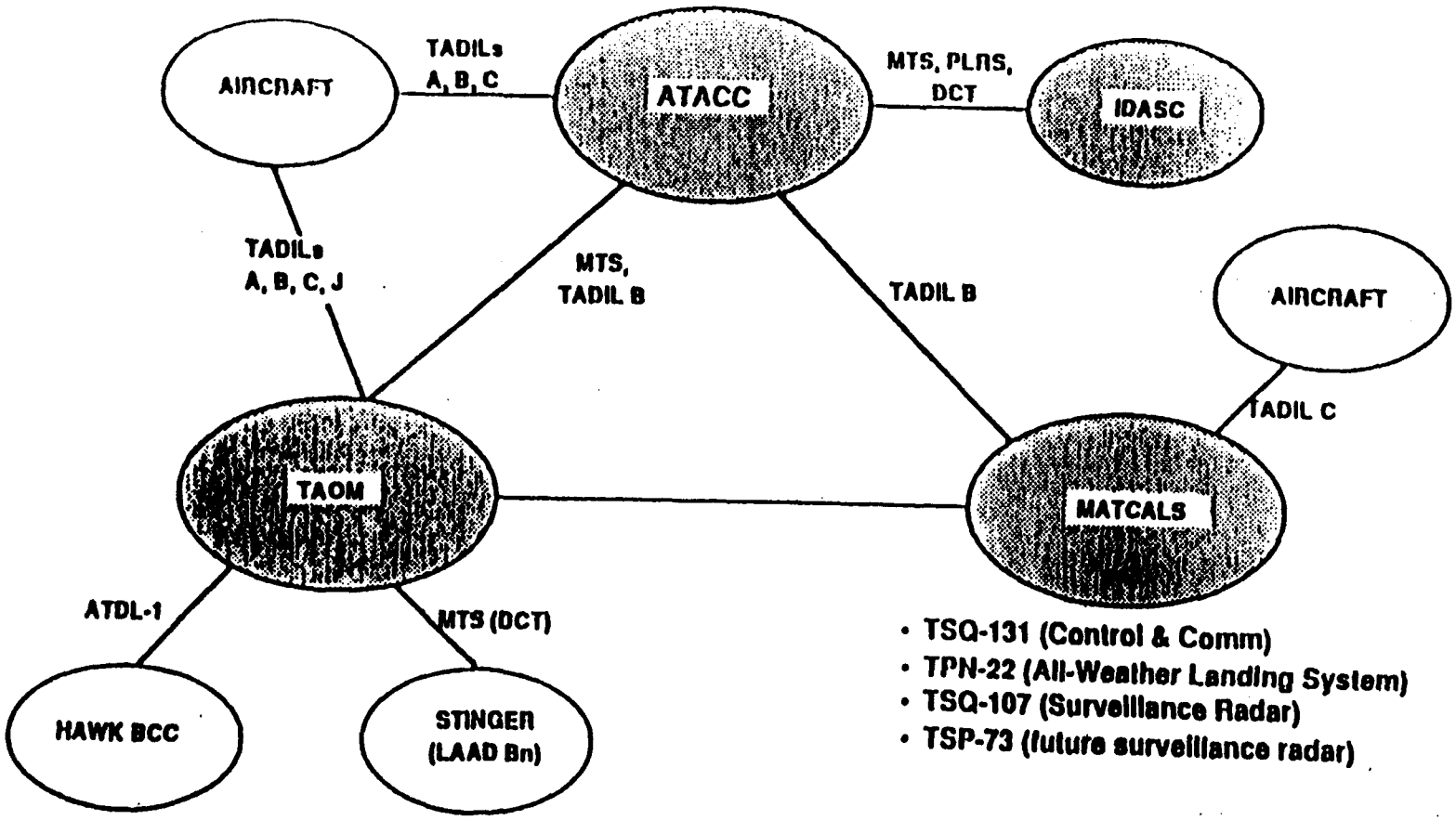
Key: ⬭ MTACCS CSS C2 Subsystem

SOURCE: IDA Assessment ADP Commonality, 1989

Glossary:
CAEMS: Computer-Aided Embarkation System
CSSIN: CSS Information Network
IFASC: Improved Force Automated Services Center
MASC: MAGTF Auotmated Services Center (P3I)
M3S: Marine Corps Standard Supply System
MILOGS: Marine Integrated Logistics System
MIPS: Marine Integrated Personnel System
REAL FAMMS: Real-time Finance and Manpower Management Information System

FIGURE - 3

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) SUBSYSTEMS AND INTERFACES

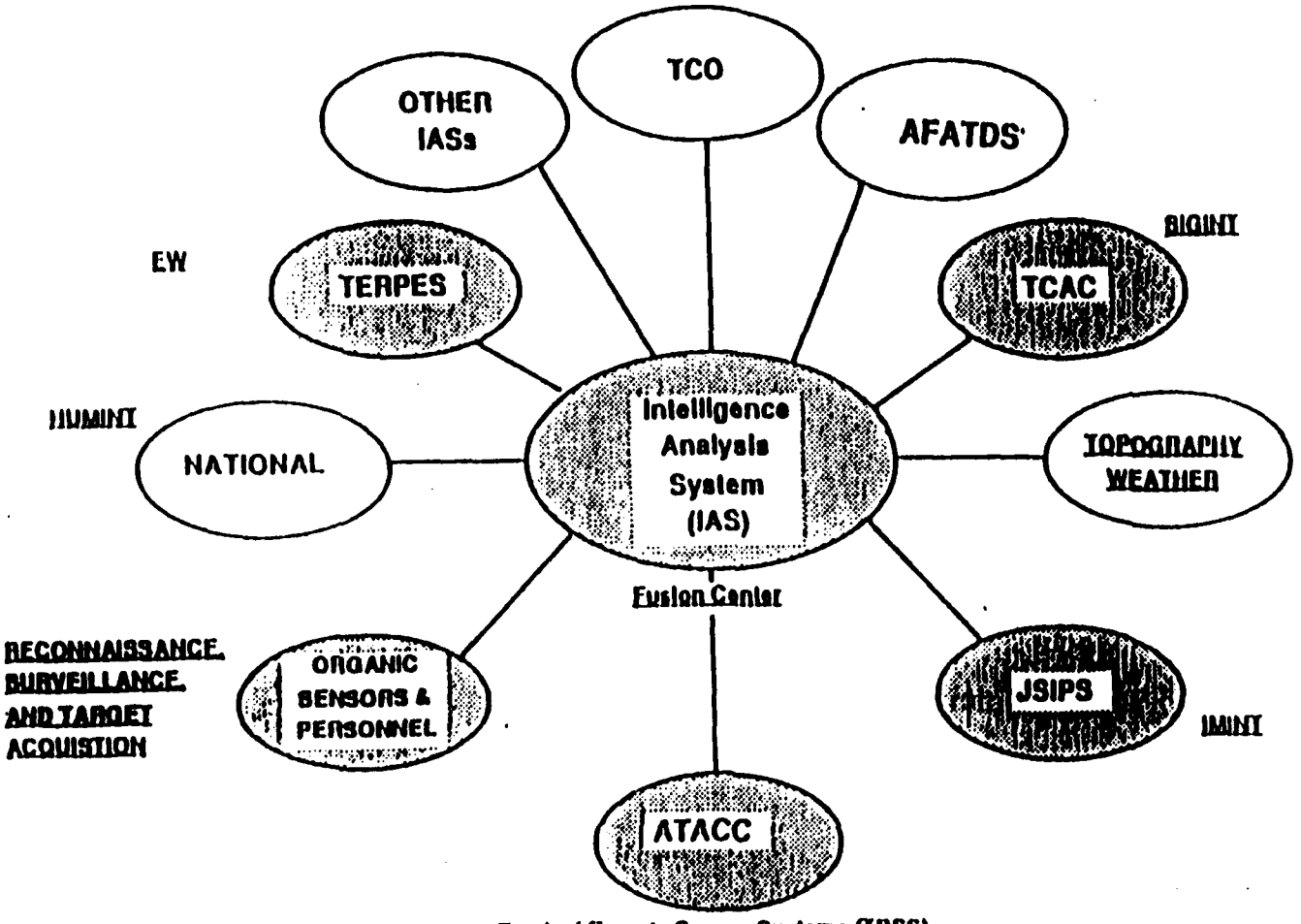


SOURCE: IDA Assessment ADP Commonality, 1989

Figure - 4

23 d

MARINE AIR-GROUND INTELLIGENCE SYSTEM (MAGIS) SUBSYSTEMS AND INTERFACES



SOURCE: IDA Assessment ADP Commonality, 1989

Figure - 5

"information pipelines" will allow transmission of messages on any available circuits. This is the same philosophy as Copernicus. My recommendations are provided in Chapter 5. But, basically, MTACCS must simply provide the MAGTF commander with the ability to effectively command and control his forces in an environment of uncertainty and on an increasingly complex and lethal battlefield across the spectrum of conflict. It must be capable of providing the MAGTF commander fused and correlated information. [17]

CHAPTER 4

ANALYSIS

My analysis of USN/USMC C2 centered on disconnects, interoperability failures, jointness, training, cost savings, and a sanity check.

Disconnects

It seems to me that the major disconnect in the U.S. military C2 effort is simply that each Service still "does its own thing". The services still "train and equip" the warriors who eventually chop to the war fighting CINCs (Commanders in Chief). There have been many efforts over the years to connect all the services C2 programs/systems/efforts. An example was the Congressional outcry after Grenada in 1983. when an Army general standing on a Navy ship within sight of his troops ashore, could not talk to them due to radio and crypto keylist mis-matches. And on the same operation, an Army officer had to use his own telephone calling card to call the States for connectivity for USN air support from a civilian telephone for the same reason.[18]

As mentioned, the JTC3A and the Joint Interoperability Engineering Office (JIEO), as well as other joint standard bearers, have been set up by JCS. But, the services have still largely bought what they wanted. A recent JCS (J-6) action may be helping to standardize C2 by requiring J-6 certification of all Mission Element Need Statements (MENS) of all the services. This same J-6 action requires all service C2 requirements documents to be

certified by the J-6. This amounts to a line item veto of the services C2 programs. It will also undoubtedly slow down the already glacial speed acquisition process. But, it could stop the interservice disconnects and enforce C4I for the Warrior across the services.[19]

Interoperability failures and lack of jointness analysis quickly comes to the same bottom line as disconnects. Some form of joint enforcement hammer is required to keep the USN/USMC, and all other services, in step with C4I for the Warrior.

Jointness and Space

Clearly, space based assets (satellites) are the central feature of C4I for the Warrior and for Copernicus. And, while the USMC clearly will not have its own constellation of satellites in the near future, the Corps must be able to access the nations assets to support the Corps maneuver warfare doctrine, especially in support of over the horizon amphibious operations. Maneuver warfare means the following to a Marine:

-- Rapid, flexible, opportunistic maneuver in time and space
-- To gain time and spacial advantage over the enemy
-- To operate with uncertainty and friction
   --- To mitigate against these unknowns
-- Pit strength against weakness
   --- Disrupt /defeat the enemy where he is weak
-- To use operational tempo as a weapon
   --- To unhinge the enemy's cohesion [20]

Space support of Maneuver Warfare C2

The USMC's use of space systems for C2 and intelligence gathering was clearly demonstrated during Desert Storm. And, it will be an even more vital asset as we shift from a containment strategy to a world stability strategy. As the Corps faces multiple uncertain threats around the globe, just like the Navy's Copernicus architecture, we must be able to focus on diverse regions quickly for intelligence and C2 purposes. As we do, space is our ace in the hole to reduce uncertainty, moderate friction, generate higher operational tempos , and help pit Marine strength against enemy weakness. The USMC has, or should have, a strategy for doing this according to what BGEN. Sutton, USMC, called the What, How and Why Strategy.

What? - The Corps must integrate or develop the ability to access to access national systems, DOD common user systems, and civil/ international systems.

HOW? - The USMC must develop or buy receivers/ terminals, work stations, and mission planning tools which can "plug in" to the above systems in order to achieve the exact same goals as C4I for the warrior.

Why? - There are two very simple reasons. First, so that the USMC can leverage off of the existing and future constellations. Second, so that the Corps will be interoperable with all other battle space players.

There are probably hundreds of examples of how the USMC would use space support of maneuver warfare C2. But, for the sake of brevity, lets look at one - the amphibious assault. The MAGTF

commander needs the following from space systems (always backed up by manual systems) in order to execute this most difficult of military operations:

- Attack warning enroute to and in the Amphibious Objective Area (AOA)
- Ballistic missile and air threat warnings
- Mine (shallow water) warnings
- Assured delivery of imagery and Electronic Intelligence (ELINT)
- Real time data link with USN/USMC reconnaissance forces
- Artificial illumination of Earth from space (desired future capability)
- C2 of forces ashore and intelligence push to squadron/battalion level
- Terrain and weather analysis
- MAGTF connectivity with NCA/CINCs
- Mobility execution aids and planning aids
- And ultimately, space based fire support (yes, weapons, on call, in space) [21]

In my opinion, space is the C2 vehicle of the future for the same reason that it has been so successful as the television vehicle for the world today. We can hardly imagine going back to VHF broadcast TV after having CNN live around the world via satellite.

Training

The USN/USMC team needs a joint controller Military Occupational Specialty (MOS). C2 and interoperability have become so complex and so vital, that the Naval service should institute an unrestricted line officer specialty for Navy and Marine Corps officers who should attend a joint C2 school as their career level school as an 0-3. We could call him/her a C4I Warrior, trained in all service C2 processes and equipment for about a year. The feeder skills for officers assigned to this school should be Air defense control officers, Naval Flight Officers, Forward Air Controllers, and other C2 type junior officers. The school should be followed by assignment to an own Service or joint duty tour as a C2 planner or operator. The point is for the C4I Warrior to be able to conduct C2/C4I operations anywhere, anytime, using any Services process or equipment.

Cost savings

The large DOD budget cuts mandated by Congress in the post Cold War era will force C2 budget cuts as well. Basically the USN/USMC just need to stress interoperability and commonality of C2 systems. Smaller, lighter transmitters and receivers of the future probably will be inherently less expensive than past systems. And, neither service should unilaterally develop any C2 system before seeing if the JCS C4I for the warrior program might not be able to provide a military wide solution. I believe that this will be mandated anyway.

Sanity Check

The military today has a wealth of great C2 processes and systems. These will be with us for years to come and will be replaced slowly due to budget constraints. New, high technology communications systems of the future will probably make joint interoperability much easier to attain. We need only look at the cellular telephone and CNN to see that military C2 will only get better. Still, I have some specific recommendations in the next chapter which I think will help make USN/USMC C2 better in the 21st century.

CHAPTER 5

Recommendations

My recommendations follow the C4I for the Warrior road map for the USN/USMC team as follows:

Quick fix phase:

The absolute first step is to enforce the joint standards already in place with an iron fist. No one should receive money to procure a C2 system that is not interoperable.

The second step should be to provide E-2C aircraft, or an equivalent type system, in order to improve MAGTF C2 flexibility, improve communications over the horizon, and, as a by product, improve air defense warning time.

The third step is to establish a joint controller course for USN/USMC officers who will not only employ C4I for the Warrior over their careers, but will also design the C2 systems for 2020 and beyond.

Step four is for the USMC to create a C2 czar at the requirements center at Quantico, Virginia, as opposed to the policy level (Headquarters Marine Corps) where it is today. The reason is that current acquisition regulations are written such that the requirements people are forbidden to be too specific, the acquisition people are not given detailed requirements or instructions, and the policy makers at Headquarters Marine Corps

are not in the acquisition accountability loop at all. And, no one is really accountable to the warriors or the taxpayers for botched C2 procurements. Therefore, I think that the C2 czar should be given total responsibility and accountability for developing, acquiring, and fielding the next generation of C2 systems which conform to centrally (joint) managed standards.

Step five is for the Corps to buy the right satellite terminals to fully access DOD, civil, and international systems as required. As a follow-on, the Corps should buy only those ground recievers/terminals/workstations which can plug into the C4I for the Warrior and Copernicus architectures.

Step six is to establish reliable, easy access to the Navy's shore based intelligence fusion centers for any MAGTF.

The last, and most time critical, step is for the Corps to fully participate in the Link 16 program because without it we will be left behind in joint battle management almost immediately.

Mid term phase:

This is approximately 2000 to 2010. This is the time to develop, test, acquire, and field one system architecture which makes the U.S. military - all of it - interoperable. This is also the time for the Marine Corps to replace its heavy, older C2 systems with truly expeditionary C2 systems.

Enduring phase:

Finally, this phase involves the services identifying technologies to make C2 an even more powerful force multiplier and a means of gaining victories with a minimum cost in blood because

C2 then, as now, must provide correct intelligence, correct orders, and timely control of American warriors.

ENDNOTES

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2.Coakley, Thomas P., Command and Control for War and Peace. (NDU Press, 1992), 17.

3.C4I for the Warrior, Objective Concept, (CJCS, 4 September, 1992), 2.

4. Ibid. 60.

5.Loescher, Michael S. Lcmdr., USN, "Navy Reshapes, Developes Copernicus Architecture." Signal July 1990: 59.

6.Ibid. 60.

7.Ibid. 60.

8.Ibid. 60.

9.Ibid. 60.

10.Ibid. 61.

11.Ibid. 61.

12.Ibid. 61.

13.Walsh, Edward J."Navy's Communications Upgrades Geared to Improved Interoperability." Armed Forces Journal December 1991: 56-59.

14.Boyes, Jon L., Vadm.,USN (Ret.)"Naval Battle Management Faces Radical Change" Signal April 1991: 50.

15.Etnyre, W.R., Ltgen.,USMC, "Marine Tactical Command and Control System Operational Concept" Marine Corps Combat Development Command, 3 April 1990 ,1.

16.Ibid. 2.

17.Ibid. 8.

18. Metcalf,Joseph, VADM, USN, (Ret.). "Grenada Case Study." Industrial College of the Armed Forces, 12 April 1993.

19.Stewart, Nelson, Ltcol. USMC, C2 Requirements Officer, Marine Corps Combat Development Command. Personal interview. 15 March 1993.

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21.Ibid.

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